Patent No. 4,163,187, hereinafter Thomas); and Claims 44-48 and 55-66 were indicated as containing allowable subject matter.

Applicants appreciatively acknowledge the indication of allowable subject matter.

In response to the objection to Claims 33-67 and the rejection of Claims 41-48 and 67 under 35 U.S.C. §112, second paragraph, Claims 33-45, 47, and 49-54 have been amended by way of the present amendment, consistent with 35 U.S.C. §112, second paragraph, and correcting the identified informalities. Claims 33-67 are thus believed to be definite under 35 U.S.C. §112, second paragraph, and the outstanding rejection on that basis, as well as the outstanding objection, are believed to have been overcome. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned so that mutually agreeable claim language may be identified.

Claims 33-43, 49-54, and 67 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Elton in view of Thomas. As recognized in the outstanding Office Action, "Elton does not teach two vectorial quantities of flux, per se, or that the machine is "directly connected" to a distribution or transmission network."[1]

Thomas is asserted for its teaching of an alternator speed controller and method for using two sets of stator windings to provide variable speed control for a generator.

Independent Claim 33, as amended, is directed to a system configured to control a speed of a rotating electric machine. The system includes a flux generation mechanism that generates a stator flux and an air gap flux. The stator flux and the air gap flux provide a flux having at least two vectorial quantities. The rotating electric machine includes at least two electric windings that respectively generate the stator flux and the air gap flux. The electric windings include an electric conductor, a first semidconducting layer, an insulating layer, and

[1] See Office Action dated March 4, 2002, at numbered paragraph 5, page 3.

a second semiconducting layer. The rotating electric machine is configured to be directly connected to a distribution network or a transmission network.

Elton is directed to a use of a pyrolyzed glass fiber layer in a variety of applications. For example, Elton describes surrounding conventional bar-type windings of an electric machine with a layer of pyrolyzed glass fiber in electrical contact with ground to minimize corona discharge by providing a path to ground to bleed off built up charges.[2] Elton also describes using a semiconducting pyrolyzed glass fiber layer to equalize the potential on the exterior of the insulator of a cable.[3] Elton describes yet another application of the pyrolyzed glass fiber layer as a way to protect electronic components by coating the exterior surface of a housing with the semiconducting pyrolyzed glass fiber.[4]

However, Elton does not teach or suggest that the cable shown in Figure 7 could be used as a winding in an electric machine. On the contrary, the cable in Elton is but one of several exemplary applications of the pyrolyzed glass fiber layer described in Elton. There is nothing in Elton to suggest a desirability of using the cable shown in Figure 7 of Elton as a winding in an electric machine.

Elton recognizes that in the end-winding region just outside of the stator of an electric machine, there will be problems caused by strong electric fields. As a solution, Elton describes using a known grading near the stator to allow some of the accumulated charge to bleed off to the stator, thus reducing the risk of arcing, but Elton offers no other solutions to the problems in the end-winding region. The strong electric fields will be present throughout the end-winding region, not just near the stator. The grading used in Elton will help to lessen the effects of the strong electric fields near the stator, but will not address the problems in the end-winding region away from the stator. Elton uses rigid bar-type windings which are able

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[2]See Elton, column 2, lines 44-48, and Figures 1-6.

[3]See Elton, column 7, lines 12-17, and Figure 7.

[4]See Elton, column 7, lines 38-43, and Figure 8.

to withstand mechanical stresses caused by induced fields between the windings in the end-winding region, where electromagnetic fields are not contained in the winding. The mechanical rigidity of the bar-type windings suppress the amount of vibration in the end-winding region that would otherwise be present. The fact that a grading system is used to lessen the end-winding region problems near the stator in Elton is further evidence that Elton does not suggest using the cable of Figure 7 as a winding of a machine, since such a cable would not have a grading.

The "invention" in Elton is the pyrolyzed glass fiber layer. Elton describes a process of immersing the winding portions in a bath of resin and vacuum pressure impregnating (VPI) the resin in the winding.[5] The VPI process results in a cured resin having no voids or gaps between layers.[6]

The cable shown in Figure 7 of Elton includes two pyrolyzed glass fiber layers, layers 104 and 110.

> The internal grading layer 104 is a semi-conducting pyrolyzed glass fiber layer as disclosed herein. . . . An insulation 106 surrounds internal grading layer 104. On the external surface of insulation 106, a semi-conducting pyrolyzed glass fiber layer 110 equalizes the electrical potential thereon.[7]

As further evidence that the cable shown in Figure 7 Elton would not be suitable as a winding in an electric machine, having two pyrolyzed glass fiber layers would cause the cable to be prohibitively stiff for winding through the stator slots. It may be possible to VPI the entire stator in a large resin bath after it had been wound with a flexible cable. However, such a process would not be feasible to produce both the internal grading layer 104 and the external layer 110 since an insulation layer 106 surrounds the internal grading layer 104 and both layers 110 and 104 would need to be exposed to the resin. Accordingly, while Elton

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[5] See Elton, column 4, lines 23-25.

[6] See Elton, column 4, lines 27-30.

[7] See Elton, column 7, lines 19-26.

describes how to provide a pyrolyzed glass fiber layer for a bar-type winding, Elton does not teach or suggest that the cable of Figure 7 could be used for such a purpose, especially since the cable in Elton would be stiff, not flexible.

Thomas is directed to an alternator having a single stator including two windings.[8] As described in Thomas at column 1, line 58-column 2, line 10, the first stator winding includes a relatively high number of turns of a wire having a relatively small cross sectional area. The second stator winding, on the other hand, includes a smaller number of turns of a wire having larger cross sectional area. The configuration of these windings dictates that an output will be provided on the first stator winding at a lower rotor velocity, and that a higher current output will be provided on the second stator winding, but will require a higher rotor velocity to generate this output. Using this technique, the alternator of Thomas can produce an additive higher output current at higher rotor velocities than would be achievable by having only a single stator winding having a large number of turns of a wire having small cross sectional area. Furthermore, this higher output can be achieved without requiring a large number of turns of the second stator winding having a large cross sectional area, thereby, saving space. It is respectfully submitted that Thomas does not teach or suggest speed control for a generator, but rather, a technique for generating higher output current at higher rotor velocities. Furthermore, Thomas does not teach or suggest what is also lacking in Elton, namely, a rotating electric machine having a winding that includes an electric conductor, a first semicoducting layer, an insulating layer, and a second semiconducting layer having the configuration as required by independent Claim 33.

Consequently, it is respectfully submitted that no matter how Thomas and Elton are combined, the combination fails to teach or suggest the invention defined by independent Claim 33, or Claims 34-40 and 49-52, as amended, dependent therefrom. Because

[8] See Thomas, column 1, lines 55-58.

independent Claims 41, 53, 54, and 67 include the features relevant to the discussion above, it is respectfully submitted that these independent claims, as amended, as well as Claims 42 and 43, as amended, dependent from Claim 41, also patentably define over a combination of Elton and Thomas.

Consequently, in view of the present amendment, and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 33-67 is definite and patentably distinguishing over the asserted prior art. The present application is therefore believed to be in condition for formal allowance, and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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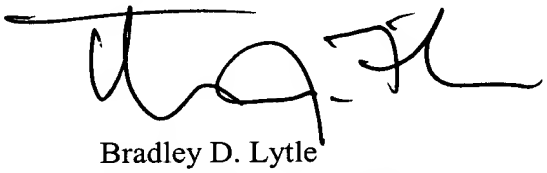

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